

Claims

1. An antenna apparatus comprising: a first orthomode transducer for combining first and second linearly polarized wave signals into a circularly polarized wave signal and for outputting the circularly polarized wave signal; a second orthomode transducer disposed above said first orthomode transducer, for separating the circularly polarized wave signal outputted thereto from said first orthomode transducer into third and fourth linearly polarized wave signals, and for outputting them; a first rectangular waveguide for propagating the third linearly polarized wave signal outputted thereto from said second orthomode transducer; a second rectangular waveguide disposed bilateral symmetrically to said first rectangular waveguide, for propagating the fourth linearly polarized wave signal outputted thereto from said second orthomode transducer; a third orthomode transducer disposed below said second orthomode transducer, for combining the third and fourth linearly polarized wave signals respectively propagated thereto by said first and the second rectangular waveguides into a circularly polarized wave signal, and for outputting the circularly polarized wave signal; and a radiator disposed above said third orthomode transducer, for emitting the circularly polarized wave signal outputted thereto from said third orthomode transducer to a reflector.

2. The antenna apparatus according to Claim 1, characterized in that when said radiator receives a circularly polarized wave signal from said reflector, said third orthomode transducer separates the circularly polarized wave signal into

third and fourth linearly polarized wave signals and outputs them, and, when receiving third and fourth linearly polarized wave signals from the first and the second rectangular waveguides, respectively, said second orthomode transducer
5 combines said third and fourth linearly polarized wave signals into a circularly polarized wave signal, and outputs it, and said first orthomode transducer separates the circularly polarized wave signal into first and second linearly polarized wave signals and outputs them.

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3. The antenna apparatus according to Claim 2, characterized in that an elevation angle rotary member for supporting rotation of said radiator and said reflector in a direction of an elevation angle is inserted into each of said
15 first and second rectangular waveguides.

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4. The antenna apparatus according to Claim 3, characterized in that an azimuth rotary member for supporting rotation of said radiator and said reflector in a direction of an azimuth angle is inserted between said first orthomode transducer and said second orthomode transducer.

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5. The antenna apparatus according to Claim 3, characterized in that said elevation angle rotary member is constructed using a coaxial-cable rotary joint.

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6. The antenna apparatus according to Claim 1, characterized in that each of said orthomode transducers comprises an electric wave branching means for, when receiving a circularly polarized wave signal, making a horizontally

polarized electric wave included in the input circularly polarized wave signal branch toward first horizontal symmetrical directions, and making a vertically polarized electric wave included in the circularly polarized wave signal
5 branch toward second horizontal symmetrical directions, a first electric wave propagating means for propagating a part of the horizontally polarized electric wave and a remaining part of the horizontally polarized electric wave branched by said electric wave branching means, for combining both the parts of
10 the horizontally polarized electric wave into a linearly polarized wave signal, and for outputting it, and a second electric wave propagating means for propagating a part of the vertically polarized electric wave and a remaining part of the vertically polarized electric wave branched by said electric
15 wave branching means, for combining both the parts of the vertically polarized electric wave into a linearly polarized wave signal, and for outputting it.

7. The antenna apparatus according to Claim 2,
20 characterized in that an RF module for amplifying a linearly polarized wave signal inputted thereto is inserted into each of said first and second rectangular waveguides.

8. The antenna apparatus according to Claim 7,
25 characterized in that said RF module comprises an amplification path for amplifying the linearly polarized wave signal outputted from said third orthomode transducer and for outputting the amplified, linearly polarized wave signal to said second orthomode transducer, and a passage path for
30 outputting the linearly polarized wave signal outputted from

said second orthomode transducer to said third orthomode transducer.

5 9. The antenna apparatus according to Claim 2, characterized in that said apparatus is provided with an input/output means for inputting and outputting the first and second linearly polarized wave signals to and from the first orthomode transducer.

10 10. The antenna apparatus according to Claim 3, characterized in that said reflector has a rectangular aperture having a larger size in a direction of an elevation angle axis than a size in a direction perpendicular to the elevation angle axis.

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